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1 August 1984

MEMORANDUM FOR: National Foreign Intelligence Board Principals

FROM: Herbert E. Meyer
Vice Chairman, National Intelligence Council

SUBJECT: Concept Paper and Terms of Reference for NIE 11-7-85
The Future of Soviet Sciences

1. The Director of Central Intelligence has approved the preparation of a National Intelligence Estimate on the future of Soviet sciences. The NIE will be prepared under the auspices of the National Intelligence Officer for Science and Technology. The principal drafter will be [redacted] CIA's Office of Scientific and Weapons Research. STAT

2. We have scheduled a meeting of the NFIB representatives for 15 August at 0900 hours in Room 7 E 62, CIA Headquarters. Please have your representatives pass their clearances and call [redacted] with their attendance plans by Noon on 14 August. STAT

[redacted] STAT

Herbert E. Meyer

Attachment
Concept Paper
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NIE 11-7-85: The Future of Soviet Sciences

Concept Paper

Science provides the understanding from which technology can be developed, thus a knowledge of the status and future of Soviet scientific research, their resources for conducting such research, and the organization and policy directing this research can give an early indication of potential technologies of the future. Soviet ideology has stressed the importance of scientific research and much emphasis has been placed on education and facilities for such research. One recognizes that it is impossible from an assessment of Soviet science to project precisely the technologies which will be developed and the weapon systems which would be based on these technologies. An assessment of Soviet science, however, would establish a base upon which future technology assessments and estimates could rest. Having such a base should provide much needed information for those who are attempting to assess emerging technology and other technology developments in the Soviet Union.

In addition many policymakers and others recognize the need for information about the future of Soviet science for prudent policy decisions related to US scientific funding and research decisions. Policymakers would include the President's Science Advisor, the Director of the National Science Foundation and those DoD persons responsible for 6.1 and 6.2 research.

A National Intelligence Estimate on Soviet science must address the governmental policies driving scientific research. The criteria used by the Soviet government to establish future research directions must be discerned, as well as which scientific disciplines are now, and will in the future, be receiving the greatest emphasis and support. The Estimate must also evaluate the quality and level-of-effort of current scientific research in the Soviet Union. Such an evaluation would include an assessment of the status of current research, resources for conducting such research, and the effectiveness of the organizational structure which manages this research. It is, futuremore, important to understand how the results of basic science make their way into new Soviet technology.

The influence of foreign scientists and scientific research on the Soviets will be addressed and will include any apparent policy decisions related to exploitation of Western efforts. The extent to which Soviet science and scientists are used for political/propaganda purposes will be assessed. The importance of international meetings, scientific exchanges and foreign scientific journals to Soviet research will be discussed. The need for foreign scientific instrumentation in research laboratories will also be assessed.

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The Estimate must project what the quality and extent of Soviet scientific research is likely to be in the 1990s. Such a forecast would depend heavily on the education being provided today to the pool of future scientists, and would follow from an analysis of the interaction between projected government policies, organizational research management, and projected availability of facilities, equipment, and personnel. The effects of demographic trends on the scientific personnel and research will be addressed. Finally, and most importantly, the impact on the Soviet Union and the United States in the 1990s of the current and projected Soviet scientific effort will be assessed.

This NIE will concentrate on a limited number of specific scientific areas where potential applications seem likely but each area will include as much breadth as possible. To make the estimate manageable, the number of fields will probably be limited to no more than ten even though ideally an NIE might include all potentially significant areas of science. It seems reasonable that there be a follow-on estimate with additional fields of science to complement the first one so that over a period of time our understanding of the quality of scientific work being done by the Soviets and a projection of this work into the future could be build up.

During the past decade or so, there has been only a limited amount of work done by the Intelligence Community to assess Soviet science. At the National-level, there has not been in recent times an NIE or similar report on this subject. Because Soviet science has not been an area of attention by the Intelligence Community for such a long time, the expertise and data necessary to prepare this estimate do not reside primarily in the Intelligence Community. The bulk of the information needed is available only from external persons, mainly those in US academia, national laboratories, and industry and possibly West European academia who have over the years become intimately familiar with the work done in their fields of science by the Soviets. In addition, these individuals have probably had significant contacts with their counterpart Soviet scientists and have visited their research facilities on frequent occasions. The knowledge of such individuals built up from contact with Soviet counterparts over a period of years should enable them to be critically important sources of information necessary to prepare the estimate. Any classified information available from the Intelligence Community will be used to complete the information base.

To obtain the external information in a highly creditable manner, it is necessary that the scientists be interviewed by persons who are highly respected in the US scientific community. An internationally known physicist cleared at the Secret level will join with a senior scientist from the Intelligence Community personally to interview in depth the necessary number of scientists who would provide the information needed for the estimate. A more junior person would round out the team and

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would be responsible for preparation of the draft. The senior persons would be responsible for the quality control of the information received and the quality of the draft estimate itself.

It is planned that the estimate be classified at the Secret level and be submitted to NFIB for approval during the second quarter of FY 1985.

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Terms of Reference

I. Key Judgments

Main findings of the Estimate with emphasis on the estimated health of Soviet science in the 1990s and its impact on the United States.

II. Introduction and Background

Importance of scientific research to the Soviets.

Base for and impact on military technology, economic development, and political prestige.

Soviet ideology and historical support of science.

Successes in science.

Scope of Estimate.

III. Environment for Soviet Scientific Research

This section will discuss the environment in which the Soviet scientist works and the support which he receives. It will elaborate on those aspects of the environment which enhance his potential and those which detract from it.

A. Policy

What is the policy toward:

-- directing scientific research? What criteria are used to establish future research directions?

-- support of basic vs applied research?

-- support of theoretical vs experimental research?

-- demand for scientific research related to military support?

-- scientists who are party members vs those who aren't?

-- scientific contact with non-Soviet scientists?

-- exploitation of Western scientific research efforts?

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-- use of Soviet science and scientists for political/propaganda purposes?

-- assimilation of non-Russian scientists.

B. Organization and Management

What are the principal features of the organization of Soviet scientific research?

What is the general management style of Soviet scientific research?

What are the effectiveness and efficiency of the organizations and management of Soviet sciences?

How do basic scientific results actually get incorporated into new technologies?

What are the political factors associated with the management of Soviet sciences? How important is party loyalty or membership?

How does the Soviet military influence the selection of projects and research management?

C. Resources

What is the extent of the financial resources allocated to science?

What is the quality and availability of:

-- equipment such as particle accelerators and nuclear research reactors?

-- instrumentation (e.g., computers)? How does the quality and availability of instrumentation affect research?

-- logistic support for scientists?

-- junior scientists and technicians who serve in a supporting role?

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IV. Education of the Soviet Scientist

In order to estimate the quality of the mature Soviet scientist in the 1990s, it is important to know the quality of education that is being received today by the science students within the Soviet Union. Emphasis in this section will be placed on the quality of instrumentation and equipment used by students as well as the quality of instruction and the scope and depth of subjects being taught in both undergraduate and graduate education. This topic is a critical one to address in estimating the future of Soviet sciences.

What is the quality, depth, and breadth of scientific education at the undergraduate level?

What is the depth, breadth, and quality of scientific education at the graduate level?

What is the quality and availability of equipment for scientific education?

How is the quantity of scientists to be educated determined?

Is the quantity of scientists adequate to support a significant research program?

V. The Soviet Scientist

This section will address the quality of the Soviet senior scientist today and the approximate number of such persons. It is sometimes asserted that senior Soviet scientists are the equivalent of the best foreign scientists but the quality of the secondary scientists is significantly lower than the quality of their foreign equivalents. This point will be examined in some detail.

What is the quality and quantity of senior Soviet scientists?

How do they compare with their foreign counterparts?

What is the breadth of senior Soviet scientists?

What is the quality and quantity of secondary Soviet scientists?

How do they compare with their foreign counterparts?

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What is the attitude of Soviet scientists toward foreign science and scientists?

To what extent do Soviet scientists exploit foreign scientific research?

What is the interaction of Soviet scientists with engineers who develop technology, both civilian and military?

To what extent are Soviet scientists used as advisors to the Soviet military establishment?

VI. Soviet Scientific Research

Soviet scientific research is a critical element and an estimate will be made of how it compares today with equivalent research elsewhere. Areas which are emphasized by the Soviets will be identified and strengths and weaknesses will be discussed. To this end, several leading scientists (primarily US) who are familiar with Soviet scientific research will be interviewed in each of approximately ten major scientific fields. This information will be cross-checked and supplemented by available classified information.

What is the scope of Soviet scientific research?

What are areas of emphasis and reasons for it?

How successful is the research?

What are areas of strength and the likely impact?

What are areas of weakness and the likely impact?

What is the quality and quantity of Soviet research compared with that done elsewhere?

To what extent does Soviet scientific research support military developments?

VII. Future of Soviet Sciences

The real heart of this NIE is an estimate of the quality of the Soviet scientist research in the 1990s. In particular, the impact that Soviet scientific research will have on the future military technology program will be of special interest.

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What is the quality of scientific education likely to be in the 1990s?

What are the direction and trend in Soviet scientific research?

What is the estimated quality and scope of:

-- Soviet scientific research in the 1990s compared with those of today?

-- Soviet scientific research in the 1990s compared with those expected in the West during that same period?

What is the estimated quality and availability of:

-- Soviet scientists in the 1990s compared with those of study?

-- Soviet scientists in the 1990s compared with those expected in the West during that same period?

What impact will demographic trends in the Soviet Union have on their future research effort?

What may be the impact on the Soviet Union and the United States in the 1990s of the current and projected Soviet scientific research effort?

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